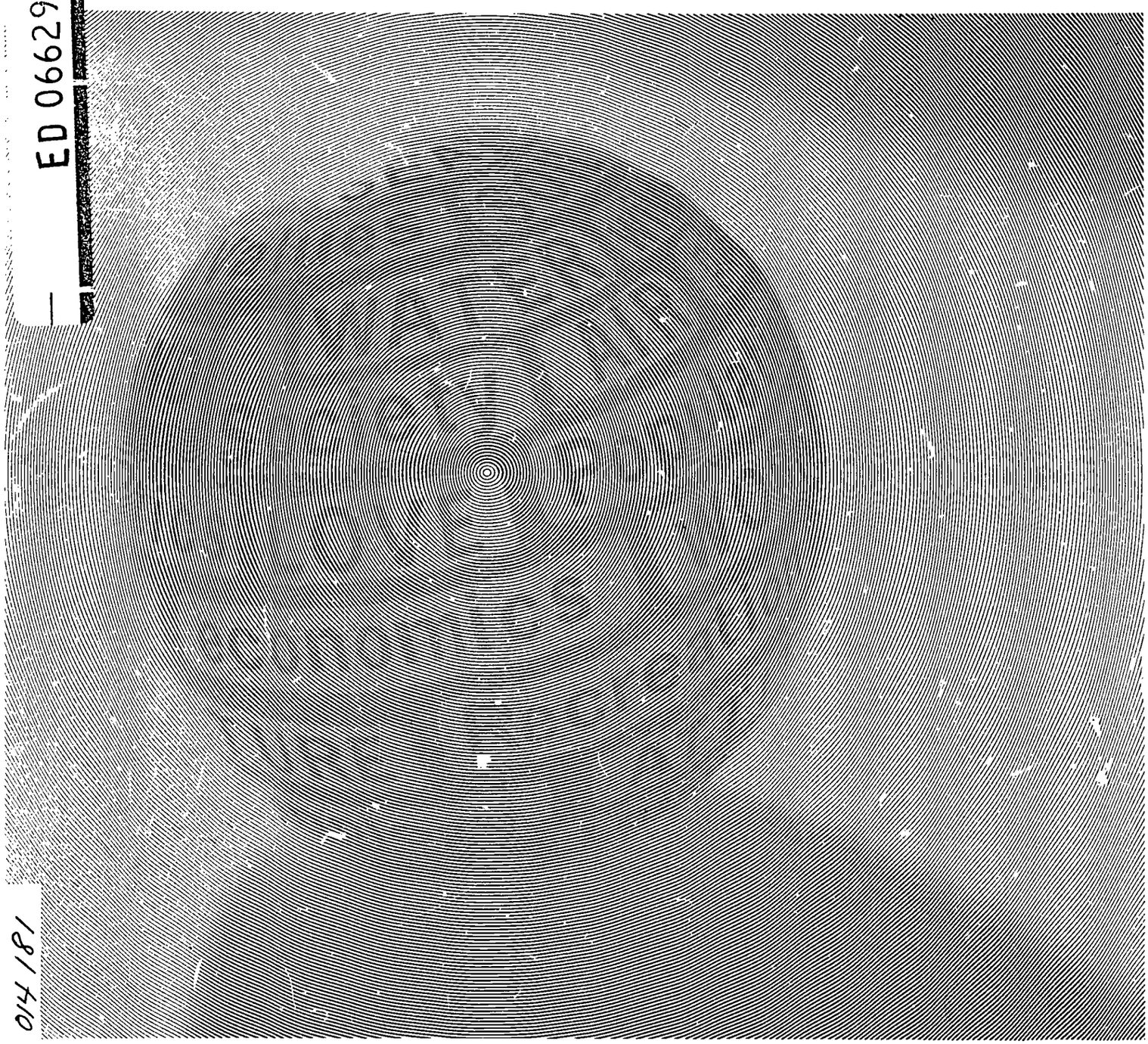
DOCUMENT RESUME

ED 066 298 SE 014 181

TITLE	Handbook of Environmental Education Strategies.
INSTITUTION	New York State Education Dept., Albany.
PUB DATE	72
NOTE	28p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Educational Strategies; *Environmental Education; Instructional Materials; Learning Activities; Motivation Techniques; Relevance (Education); *Secondary Grades; *Teaching Guides

ABSTRACT

The educational approach of this guide involves instructional strategies for integrating environmental concerns into subject matter areas. Its objective is to enumerate and illustrate numerous interdisciplinary strategies, showing how they and other teaching devices may serve environmental education goals within the operative instructional mode. Strategies suggested include use of concept-centered activity packages; common denominators, those environmental concepts showing multi-faceted curricular potential, as survival, interdependence, scarcity, recycling, planning, valuing, optimism, interaction, right vs. responsibility, social forces, and change; the printed media of newspapers, editorials, and cartoons; student involvement in community problems and projects; case studies; readings and quotations as learning activities to improve reading skills and provide incentive for future study; student environment/ecology clubs; out-of-classroom experiences; student projects; and family participation activities. Examples were prepared as resources for teacher use primarily at the middle school, junior and senior high school levels. However, the strategies focusing upon basic environmental concepts, family participation activities, student projects, and out-of-classroom experiences are adaptable to lower elementary grades. (BL)



Environmental Education Strategies

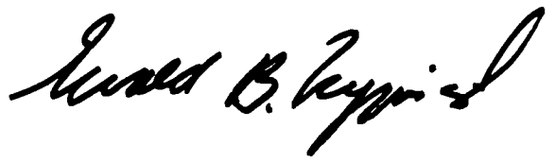
Handbook of Environmental Education Strategies

Conservation Day should be a time when we appraise the effectiveness of our past efforts and plan for future action in the struggle to improve our environment. Progress has been made in the areas of awareness and concern. However, much remains to be done to transform philosophical concerns into affirmative actions.

Environmental problems cannot be solved in isolation; they must be approached through an educational process in which individuals relate to the total environment. To this end, we are releasing this publication with the hope that everyone in the school community will find an entry point for using these materials in his program.

The Board of Regents set the following educational objectives which should serve as a guide, both to the observance of Conservation Day and to the development of sound environmental education programs: "To instill within students an awareness, concern, and an ability to evaluate the effects of their individual and society's actions on the environment; to have students develop the capacity to examine the causes of any given environmental problem and to evaluate it in a rational manner; to make students aware of the constraints which inhibit changes in either individual or collective actions given the different viewpoints and economic interests of the business and political community; and to develop students' values toward action which result ultimately in constructive change in the environment."

I urge all school personnel to initiate, and participate in, the use of curricular strategies such as those suggested herein. If students and teachers work closely together on this task, achievement of our environmental goals can be realized.



EWALD B. NYQUIST
President of the
UNIVERSITY OF THE STATE OF NEW YORK
and
COMMISSIONER OF EDUCATION

CONTENTS

Introduction

In several earlier environmental publications, an assumption was made that there are basic concepts which underlie man's natural and social existence. Suppositions were utilized to organize learning activities around these concepts.

In this publication, these, and two new concepts, are illustrated as central to learning activity schemes and as common denominators for the integration of environmental concerns into the subject matter areas.

Taking into account the larger, two-fold purpose of this document, however, the examples above are only two of many accepted instructional strategies used within or without the classroom. Thus, the first objective of this guide is to enumerate and illustrate numerous of these interdisciplinary strategies in a manner which shows how they and other teaching devices may serve environmental education goals within the operative instructional mode. As is the case with most other instructional approaches, environmental education is as conventional or as innovative as we wish to make it.

Secondly, by exemplifying in abbreviated fashion the many techniques of environmental education, we are suggesting the range of strategics which will be attended to, one or two at a time, in considerably greater detail in subsequent publications. Hopefully, this publication will serve as an inventory of viable environmental strategies, each with some elaboration, and later guides would be supplemental and incremental.

All of these materials are merely stimuli for your own inventiveness and creativity. We have attempted to make the examples concrete in terms of utility, yet suggestive in terms of the kinds of things they may prompt you to attempt. There is no "rightful subject matter province" of environment; therefore, we urge all teachers to use these examples in pursuing environmental education goals.

The strategies presented in this publication have been prepared as resources for teacher use primarily at the middle school, junior high school, and senior high school levels. However, the strategies which focus upon basic environmental concepts, family participation activities, student projects, and out-of-classroom experiences are particularly adaptable to the lower elementary grades. The rationale for each of these strategies, and some of the examples, should readily suggest environmental learning experiences for younger schoolchildren.

Concept-centered activity packages

Here and in the appendix (p. 20) are some basic concepts which pertain to man's natural and social existence. The three concepts described below, as themes for the attendant activities, serve as ways of focusing on understandings about this existence. So stated, these understandings have significant implications for the manner in which we should live.

The activity assigned to each concept is presented with the idea that participation will suggest to the student an attitude or a point of view which reflects an environmental awareness. The questions should be viewed as guides to the direction or objective implicit in the activity.

Change — dynamic modification . . . the continuous alteration of previously existing forms, styles, and substances.

Technological advances frequently occur far more rapidly than the rate of philosophical, social, economic, and behavioral change which must accommodate these advances.

Select several examples of American technological achievement and, if possible, the individual(s) responsible. Some suggestions are:

— cotton gin — Eli Whitney — 1793
— the open-hearth process (steel) — Abram S. Hewitt — 1868
— Model "T" Ford — Henry Ford — 1909

Student activity should consist of three phases:

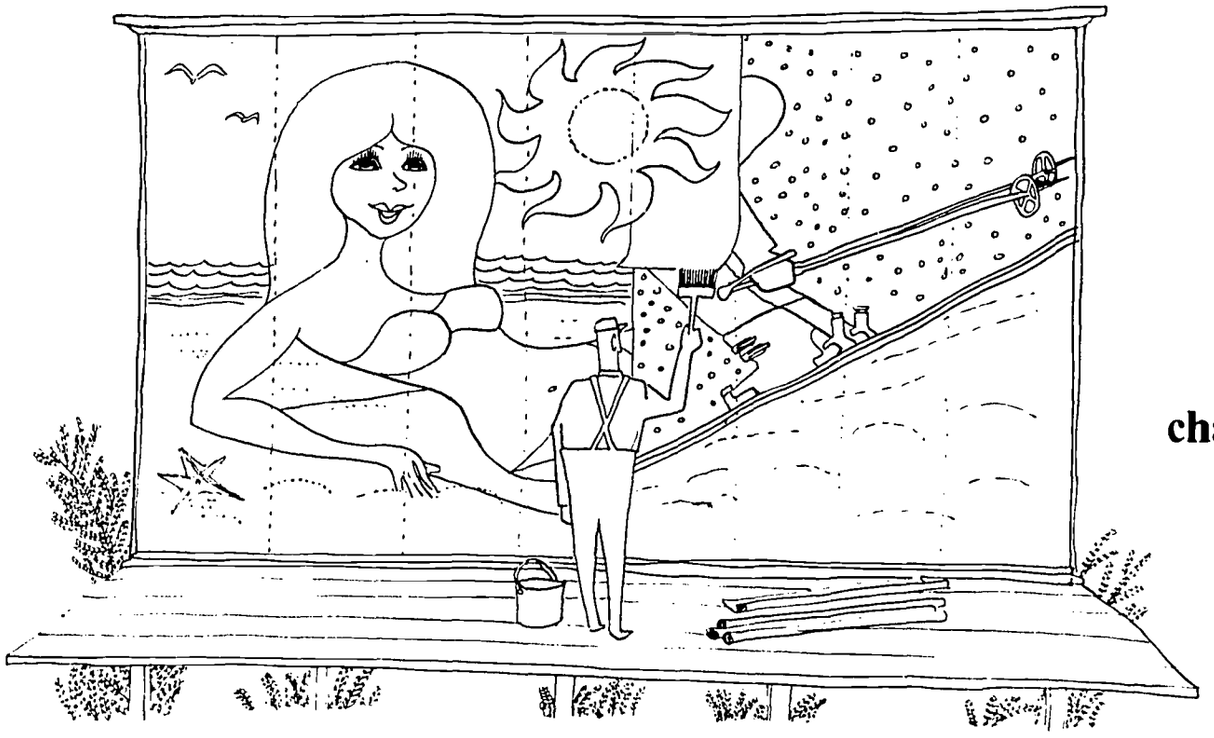
1. **Research** — Seek out the reasons for the technological development including historical background and other social, economic, and scientific circumstances which may have stimulated development. A purpose of the research is to reveal the impact of technology on society and the resulting lag in society's ability to cope with the changes wrought by technology.
2. **Hypothesis** — Several hypothetical statements should emerge from the students' research. For example:
   — "The cotton gin contributed to the American farmer's practice of mining the soil rather than farming it."
   — "The cotton gin revived and stimulated the growth of slavery in the South at a time when slavery was disappearing from the American scene."
3. **Evaluation** or **Proof** — In this phase, students would seek logical conclusions or decisions based upon information gathered from the exploration of basic questions which pervade the entire activity, such as:
   — What has been the impact of the cotton gin upon the American environment?
   — What measures has government taken to cope with this impact?
   — How has society failed to meet the challenges posed by technology?

Recycling — continuous feedback for reuse . . . in nature, the endless, circular flow of many elements.

Man would do well to observe nature's example and recycle the results of his technology.

Students should be directed to engage in a comparative study of the alternate fates of trees; namely, the characteristics of a tree throughout its entire natural cycle, and the disposition of trees through man's use of them as a resource. Examine the life cycle of a tree in a forest community.

A visit to any wooded area should provide examples of trees in various stages of development, including decomposition and the return of nutrients



change

to the soil for reuse in the growth of another tree. Comparatively, discuss lumbering and paper production with attention to the products, byproducts, and incidence of reuse of the natural resource.

- What eventually happens to a tree that dies in the forest?
- What uses are made of a decaying tree by organisms in the forest community?
- How does this demonstrate the concept of recycling?
- If man is an interloper in this cycle, how can he minimize his impact?

(A useful reference source on this subject is, "The Life of a Dead Tree," by Dorothy Schmidt, The New York State Conservationist, August-September, 1967.)

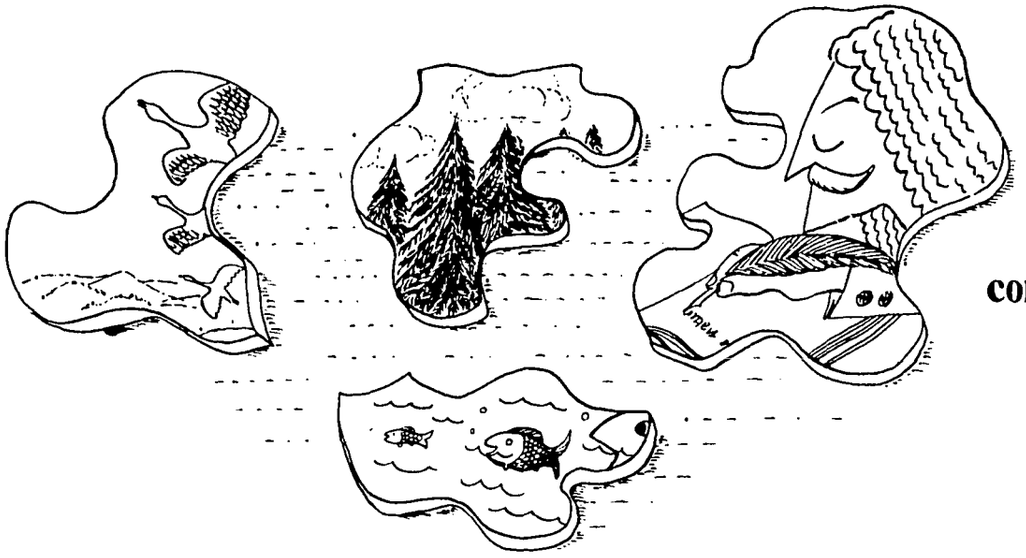
> *Interaction* — reciprocal action or influence . . . exchange, stimulation, or influence between or among organisms (including man) within their environment and/or among their respective environments.

Man's sophisticated network for communication and interaction permits the exchange of thoughts and values and the development of cultural patterns.

Survey the "unecological" and inefficient practices in your school system, including the cafeteria(s), custodial and maintenance areas, instructional program, administration, and special services. Set up student environmental practices observer committees. Assign them to observe the specific areas of concern.

After discussing in class what are desirable and undesirable environmental practices, form a steering and coordinating committee of students which will organize the development of check off and tally sheets for the survey. One example of what might be considered as an undesirable practice would be the use of containers for beverages and food which are made from nonbiodegradable materials. This might be particularly evident in the coffee containers used in the faculty rooms or at meetings. Another target might be the question of use of recycled or reclaimed paper throughout the school district. Care should be used in defining and listing undesirable practices. Subjective observations arising from unsatisfactory student-teacher relationships should not be allowed to influence the project aims.

Following the survey and tabulation of the results, an action committee would then present a report and recommendations to responsible school officials and school board members urging implementation of the findings. Such a report might serve as an excellent base for a similar community program in other public and even private areas evaluating their environmental habits and behavior.



con-cat-e-ná-tion

. . . agents of change in society . . . society must be moved to insure the preservation of the environment . . .

(Social Forces)

. . . mutual reliance . . . an organism cannot live alone . . .

(Interdependence)

. . . detailing a program of action . . . decisions concerning the future must be based on long-term environmental benefits . . . *(Planning)*

. . . smallness of quantity in relation to needs . . . as populations increase, competition for resources necessitates the establishment of priorities . . .

(Scarcity)

. . . anticipating the best possible outcome . . . man has the capacity to make this the best of all possible worlds . . . *(Optimism)*

Environmental concepts and the curriculum

By freely defining the "environmental concepts" used here, and in other Task Force publications, as "common denominators," we are attempting to underscore the multi-faceted curricular potential that most, if not all, of these succinct ideas possess. Specifically, if the broadest view of environment encompasses concern for the process of *Change* inherent in the study of weathering and erosion (science, grade 5) or in a discussion of plant succession or evolution (biology), it also embraces the concern for secession, revolution, and other changes in the social order (social studies, 5-12). Thus, the process represented by the concept of *Change* is basic to both learning disciplines as they are presently circumscribed.

Accepting the fact that numerous bases are common to several disciplines, the "environmental concept" is relevant, and an additional purpose has been given the subject matter trappings, that of understanding the environment and applying this knowledge to improving it.

The table below contains specific instances in the general 5-12 curriculum where the environmental concepts seem to be pertinent. The tabular organization is merely one means of representing these relationships and is offered only as a beginning for the teacher who wishes to uncover more of them:

Concept	*Reference
Survival	Biology; Unit 6, Evolution and Diversity, pp. 84-93.
	Social Studies, Grade 7: Our Cultural Heritage . . . ; Topic 4, New York in the Emerging Nation, p. 24 (4th Understanding).
Interdependence	Science for Children, 4-6; Grade 5, I, Living Things, 8., 10., 11., pp. 66-67, p. 162.
	Science for Children, 4-6; Grade 6, I, Living Things, 5., p. 114, p. 162.
Scarcity	Social Studies, Grade 11: American History; Topic III, American Economic Life, pp. 19-20 (Understanding 1).
	Science for Children, 4-6; Grade 6, IV, The Earth and its Composition, 6., p. 137, p. 163.
	Social Studies, Grade 12: Advanced Economics; Topic I, The Nature of Economic Understanding, pp. 2-3 (2nd-4th Understandings).
Recycling	Biology; Unit 7, Plants and Animals in Their Environment, II, C. 1. b. (2), pp. 99-100.
Planning	Mathematics 7-8 Handbook; XII. Probability, p. 197 (3rd Concept).
	Science for Children, 4-6; Grade 6, IV, The Earth and its Composition, 6. p. 137, p. 163.
Optimism	Social Studies, . . . Grade 8: United States History; Topic 2, The National-Republican Period (1800-1825), p. 80 (11th Understanding).
	Mathematics 7-8 Handbook; XII. Probability, p. 197 (4th Concept).
Interaction	English Language Arts — Literature K-12; Setting 10-12, pp. 122-123 (3rd Understanding).
	Biology; Unit 7, Plants and Animals in Their Environments, II, C. 1., pp. 95-97.
	English Language Arts — Listening and Speaking; Participation in Speaking K-6, pp. 62-63 (1st Understanding).
Right vs. Responsibility and/or *Social Forces*	Social Studies, Grade 7: Our Cultural Heritage . . . ; Topic 8, Local and State Government and Civic Responsibility, pp. 54-65 (esp. 13th, 14th, 16th, and 17th Understandings, pp. 61-62).
Change	Earth Science Syllabus; Area 1, Investigating Processes of Change; Topic I, Observation and Measurement of the Environment; Topic II, The Changing Environment, pp. 1-5.
	Mathematics 7-8 Handbook; Unit VII, The Complete Set of Rationals — Measurement. Unit X, Geometry — Measurement of Angles — Measurements and Constructions — Measurement of Distances — Measurements of Areas.

*The underlined words and phrases are the titles of State Education Department syllabuses.

Newspapers, editorials, and cartoons

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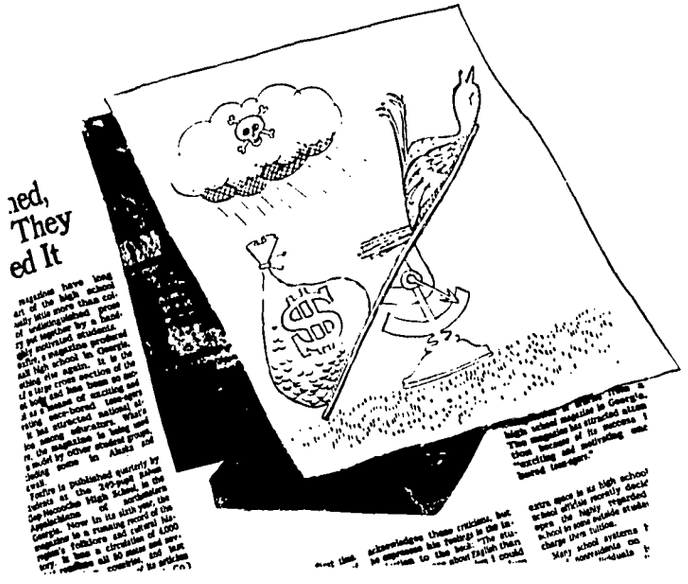

Newspapers, in general,and editorials and cartoons in particular, are excellent teaching resources for environmental education. Newspapers are successful in the classroom because they provide immediacy and relevance. They act as a vehicle for encouraging students to ask questions, to probe, and to engage in objective thinking and investigation.

An editorial often expresses a third opinion concerning a current problem or issue. Since the writer is prompted to analyze two extreme points of view, he thus arrives at a less emotional or biased compromise position. Of course, an editorial as frequently reinforces one of the two positions held without offering much more than additional subjective comment. In this case, the exercise for the student becomes one of separating subjective and objective information. Students can be encouraged to write editorials on environmental issues: environmental improvement vs. employment; environmental literacy vs. educational priorities; etc. By the use of such a learning technique, a student must establish the facts, identify causes, and test possible solutions in terms of their practicability. This process usually results in more reasonable and intelligent decisions.

During a discussion of newspaper editorials as a means of communicating ideas, have your students read the editorial reproduced below (or another you might select). As a prelude to this activity, the students should consider the following points:

- the impact of these widely distributed editorial statements upon the general reading public
- the response to editorials that is generated in the form of letters to the editor
- the motives of editors and publishers implicit or explicit in these statements.

ISSUE: Are conservationists going too far in seeking to block the construction of the Alaskan oil pipeline which would make a huge reserve of oil available to the free world?

One of the world's richest oil strikes occurred in Alaska's icelocked North Slope during the summer of 1968. The immense subterranean pool contains a proven 15 billion barrels of

liquid black gold. Some estimates put the reserves in excess of 100 billion barrels — far more than all known United States reserves put together.

Exploitation of such a tremendous national treasure trove would have begun immediately in any other country. In our own much maligned democracy, however, careful consideration is given to all voices. The result, in this case, is that the treasure found in 1968 remains untapped because environmentalists claim its removal would damage America's last great wilderness.

There is no space here to discuss details of the controversy. In essence, a consortium of oil companies has paid Alaska $900 million for the right to build a four-foot, $2 billion pipeline to carry the oil from the North Slope to the southern shipping port of Valdez. But conservationists, challenging the pipeline's safety, have held up federal issuance of the needed construction permit.

Any reader of The Hearst Newspapers should know that they have long been in the vanguard of forces battling to end pollution and other damage to the ecology. We surrender none of this vigilance in suggesting that opponents of the proposed Alaskan pipeline are being unrealistic in their zealous attempts to preserve Alaska as a frozen wonderland.

David R. Brower, a leading spokesman for the conservationists, for example has said that the Alaskan controversy is "nothing less than a test case of what the struggle to save this planet is all about . . . We need a cooling of this drive for more energy . . . We must cut down on the use of fossil fuels."

We submit that his concept if extended to its irrational conclusion, would mean a return to travel by horse and buggy and illumination by candlelight. By practical contrast, the U.S. is being forced to rely increasingly on oil imports from the turbulent Middle East.

All the pros and cons of the pipeline controversy have been sounded in more than three years of debate. At least 12 exhaustive federal reports have been compiled. Interior Secretary Morton is expected by both sides to issue the go-ahead permit, but to date it remains mysteriously withheld.

We urge granting the permit with no further delay, since it would not even mean an all-out green light. The conservationists could and presumably would block actual pipeline construction for another year or even permanently by appeals up to the Supreme Court.

The Times Union, March 23, 1972

A profitable discussion may be started with the following questions:

— What is the main controversy expressed in this editorial?
— What does the writer mean by "maligned democracy?"
— Do you feel the writer is using sarcasm? Explain by reference to the text.
— Do you accept David Brower's point of view? Why?
— Do you see a possible compromise of the two positions expressed in this editorial? If so, what might it be?

Once the class has read the editorial and discussed the accompanying questions, restate, as questions, the points offered as a prelude to the activity in the introductory paragraph.

. . . satisfying the requirements of suitability vs. accountability . . . man has exercised his right with little regard for his responsibility to the environment . . .

(Right vs. Responsibility)

. . . assessing relative worth or importance . . . man is endangering his chances for a better life through the very measures he employs to achieve it . . .

(Valuing)

Cartoons may be thought of as visual editorials. Thus, it would be useful to apply some of the considerations, which were discussed above in reference to editorials, to the cartoon.

Students can be easily motivated to identify environmental concepts that are illustrated vividly by good cartoons. Cartoons are designed, by virtue of their striking, suggestive, and puckish style to communicate a particular viewpoint about a contemporary social issue (e.g. environment). Compression of an idea is achieved by the use of symbols, stereotypes, representative objects, exaggerations, generalities, caricatures, and characterizations.

Have students react to the editorial cartoon reproduced above using a discussion format similar to that used for the written editorial.

As a further activity, the students might be encouraged to draw cartoons which express their ideas about the environment. Some of their work could be prepared as transparencies for overhead projection. Added incentive for the activity could be school or local newspaper publicity for the most "professional" or effective cartoons.

— Why is the cartoon a very effective communication device?
— How could the widespread use of this art form contribute greatly to the battle to save the environment?
— Regardless of how "good" your cartoon was, how have you contributed by drawing one?

An interesting exercise for students is to locate cartoons which have been used throughout American history. They can be used as lead-ins to a discussion of the contemporary social, political, and economic conditions they reflect.

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Students and the community

Local environmental problems offer ideal opportunities for knowledge gained in the classroom to be used with conflicts encountered in real-life situations. Circumstances which threaten to degrade the local environment should be capitalized on by enterprising elementary and secondary teachers as means of providing their students with meaningful and practical experiences in resolving these issues which have both scientific and social implications — implications which when faced, expand the students' concerns from the present to the future; from their own neighborhoods to the global community.

The concomitant benefits of such life-situation-oriented curriculum experiences will be readily recognized, for once the student has internalized the critical nature of the problem, and has been convinced that he can and should contribute to its resolution, he will be motivated to engage in activities which will give him practice in the basic skills. The student will be challenged to gather background information on the issue at hand through research and reading; he will be challenged to communicate his findings through clear and concise writing and reporting; he will be challenged to relate to his classmates and community in a manner that will promote activities which have promise for improving the quality of the environment and will, ultimately, effect, in the citizens of his community, behavioral modifications which will ensure that these environmental improvements are sustained.

Urban Mini-parks — A project such as the one described below lends itself to a host of variations.

In an urban setting it would be apropos for a secondary school teacher to stimulate student interest in changing a rubble-filled alley into a mini-recreation area by discussion of the hazards that such a situation represents to all inhabitants in terms of fire and vermin, and of the hazards to children in terms of dangerous play objects such as broken glass and discarded refrigerators.

Ideally, a group of high school students — either an after-school group or a class — should sponsor the mini-park idea. This group would be responsible for drawing up a request to gain permission to renovate the alley and further be responsible for processing it through the proper city officials. Cleanup crews could then be organized and arrangements made with the city sanitation crew to truck away the refuse.

Instructors of vocational arts could advise the students on constructing durable recreation equipment — such as simple concrete wading pools, monkey bars, and basketball hoops. The Park Department could be contacted for advice on establishing tub plantings. Announcements regarding the availability of the facilities and guidelines for its use could be written, duplicated, and distributed throughout the immediate neighborhood.

As a means of preventing the mini-park from again becoming a dumping spot, a sense of community possession should be engendered by the estab-

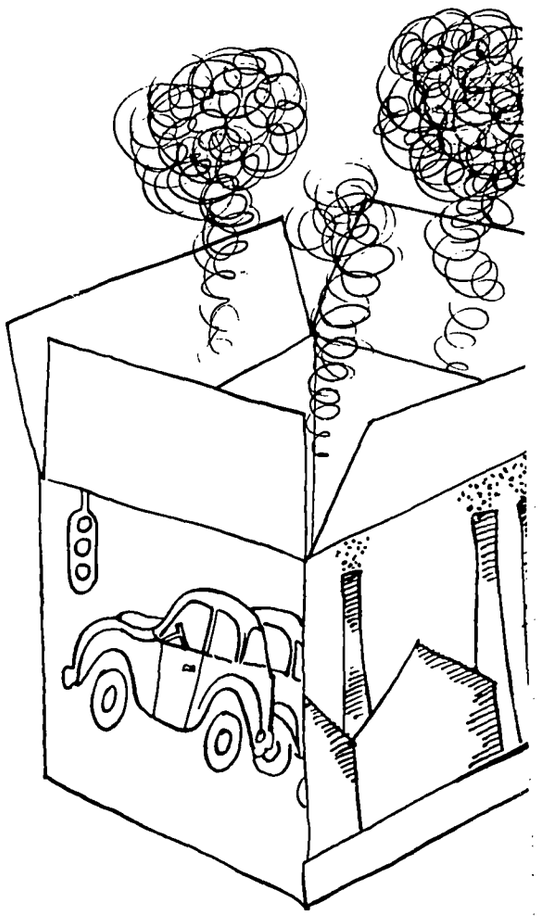
lishment of a recreational committee composed of students and adults. This committee would have a rotating membership which would be responsible for maintaining the mini-park and for scheduling periodic "community happenings" in the park. These "happenings" would have two purposes:

- To remind the residents that the park is theirs
- To deal with any abuses of the park

The opportunities to learn about community problems, to gain practice in organizing human resources, and to exercise a responsible attitude toward one's neighborhood and neighbors are all invaluable assets of such an approach to environmental education.

Environmental Citizenship Projects — These suggested activities are reprinted from the SED publication, An Environmental Experience, because they are appropriate to this Students and the Community strategy.

- Improve the appearance of school property, public parks and recreational facilities, and municipal grounds.
- Design and produce an imaginative poster campaign directed at preventing litter and discouraging indiscriminate dumping into streams, swamps, and on public property.
- Finance local advertising which will contribute to public awareness of environmental concerns.
- Design a panel-type radio or TV program highlighting local environmental problems.
- Establish a regular "award" competition for local merchants, farmers, or citizens which would recognize an environmental "conscience" or achievement.
- Use photography for documenting and publicizing community environmental improvement.



. . . continuing life (or existence) in
the presence of difficult conditions . . .
survival depends upon the ability of
an organism to adjust to its environment . . .

(Survival)

Case studies

A case study is an account of a problem which is sufficiently detailed to be synthesized into possible solutions. Teaching and learning with the case study, then, lends an air of precision to the consideration (and tentative resolution) of an issue, controversy, or problem.

Some purposes of the case study are to:

- develop skill in making decisions
- give perspective to a problem
- concretize learning
- give direction to information gathering
- imbue vicarious experiences with a sense of reality
- display numerous points of view
- increase student experience

There are many types of case studies which may be used by teacher and learner. Some merely illustrate foregone conclusions, but are useful to the extent that even conclusions tolerate opposition as well as support. More germane to environmental education, however, are the types of cases which stimulate thought on, and solutions to, unresolved issues. Some examples of this latter type are essays, news stories, fictitious accounts of real situations, documents (speeches, court transcripts, letters, diaries), and newspaper editorials.

The account below is a news story which may be used as a case study. Use the general problem-solving formula and some of the suggested methods of investigation.

"One of the most popular developments in outdoor recreation, indeed almost a life style, has been the growing use of the gasoline-powered snowmobile. Companies from Canada to Japan produce them, and millions of North Americans purchase and ride them. A multi-million dollar industry has emerged in the last decade with what seems an almost limitless potential for fun, profit, and sport. Just spend a weekend in Booneville, New York during championship competition if you doubt the popularity of this 'newcomer' to winter fun.

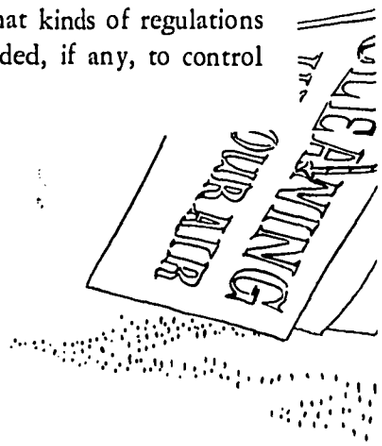
"While these vehicles have been known and used by forest rangers, utility repairmen, game protectors, and others for several years, the mass impact of millions of these machines in the hands of an ever-growing public is just beginning to be widely felt. There is little question that, in emergency situations such as airplane disasters, hunting accidents, or problems arising from blizzards and isolation, these machines are invaluable. Many lives have been saved and aid rendered because of the availability of these high-speed, determined little machines. However, in spite of their obvious utility, a number of serious problems and difficulties caused by improper and unwise use of snowmobiles has begun to overshadow the winter outdoor world. Property rights have been disregarded. Privacy, tranquility, and wildlife have been violated by these snowy speedsters. Areas that enjoyed the stillness of winter's peace have been shattered and devastated.

State governments are beginning to look closely at people and their snow machines. For example, New York, Massachusetts, and Vermont have begun to react to the snowmobile through laws, ordinances, court decisions, and new policies all aimed at protecting the public and the environment."

Step 1. Define the issue or problem.
Step 2. Gather information (facts).
Step 3. Synthesize the information.
Step 4. Venture possible solutions.
Step 5. Choose the best solution (and act, if appropriate).

Methods of Investigation

- Recognizing that considerable economic interests are at stake in the production, sale, and use of snowmobiles, pupils might investigate these economic stakes by examining such data as the number of snowmobiles in a given area, the dealers' sales volume in the same area, income and education levels of snowmobile owners, and costs of owning and operating such a machine.
- Obtain copies of current and proposed regulations concerning snowmobiles from such states as New York, Massachusetts, and Vermont. Note similarities and differences. Also obtain recent articles on the topic in local and national publications. Using these sources, have students draft legislative proposals of their own. Note the analagous situation between snowmobiles and the history of regulation of motor boats and automobiles as their numbers and hazards increased.
- Weather and other factors permitting, have students bring one or two snowmobiles to school. Start their motors within an enclosed area (with proper ventilation). Note the reactions to such an experiment. Have pupils compare and note safety devices on the machines and evaluate their effectiveness.
- Compare advertising information about machine performance. Ask students to consider the question of why snowmobile advertisers do not use the sound of their machines while advertising on TV? Evaluate this advertising.
- Invite representatives of a local snowmobile club into the classroom. Ask them to present their views on the sport and on leisure time activity in general. What kinds of regulations do they think are needed, if any, to control their operation?

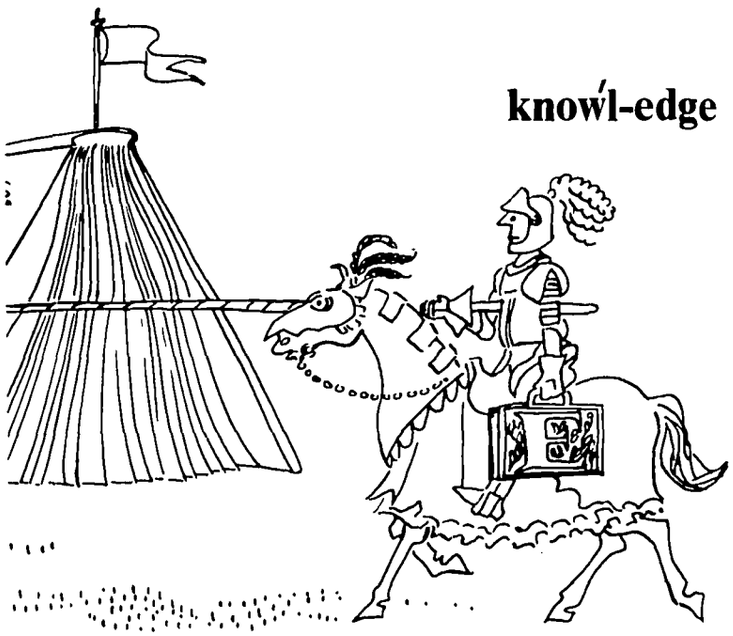


Readings and quotations

Readings and quotations with an environmental theme or flavor appeal to students because of their timeliness and because of the relevance of this issue to the quality of life they may hope for or expect as adults. Further, the readings and quotations not only provide opportunities for improving reading skills, but also supply an incentive for upgrading their reading ability. Equally important is the satisfaction to be derived from having developed an awareness of their responsibilities as stewards of the environment.

Encourage students to transfer the drama found in the written word to the drama of life, realizing that their problems are and have been the problems of man throughout the ages. This may be accomplished by posing open-ended questions that demand a transferal of insight gained from the printed page to the pageant of life. Readings and quotations such as those cited below may be used effectively with the accompanying questions.

If you are concerned about the proliferation of trash, then by all means start an organization in your community to do something about it. But before — and while — you organize, pick up some cans and bottles yourself. That way, at least, you will assure yourself and others that you mean what you say. If you are concerned about air pollution, help push for government controls, but drive your car less, use less fuel in your home. If you are worried about the damming of



knowl-edge

as learning activities

wilderness rivers, join the Sierra Club, write to the government, but turn off the lights you're not using, don't install an air conditioner, don't be a sucker for electrical gadgets, don't waste water. In other words, if you are fearful of the destruction of the environment, then learn to quit being an environmental parasite. We all are, in one way or another, and the remedies require a new kind of life — harder, more laborious, poorer in luxuries, but also, I am certain, richer in meaning and more abundant in real pleasure. To have a healthy environment,we will all have to give up things we like; we will probably have to give up things we have come to think of as necessities. But to be fearful of the disease and yet unwilling to pay for the cure is not just to be hypocritical; it is to be doomed. If you talk a good line without being changed by what you say, then you are not just hypocritical and doomed; you have become an agent of the disease.

A person who undertakes to grow a garden at home, by practices which will preserve rather than exploit the economy of the soil, has set his mind decisively against what is wrong with us. He is helping himself in a way that dignifies him, and which he will find to be rich in meaning and pleasure. But he is doing something else that is more important: he is making vital contact with the soil and the weather on which his life depends. He will no longer look upon rain as an impediment of traffic, or upon the sun as a holiday decoration. . . . The principle of ecology, if we will take it to heart, should keep us aware that our lives depend upon other lives and upon processes and energies in an interlocking system which, though we can destroy it completely, we can neither fully understand nor fully control.

Evolve a meaningful discussion using the following questions:

— What is the first thing people who are concerned about the environment should do in order to halt the destruction of our environment? How will this help?
— What is a parasite and how does it live?
— Why is environmental destruction termed a disease?
— Why will the remedy — a new way of life — be difficult to accept or become accustomed to?
— What is the "principle" of ecology?
— Why could someone who thought of the sun as a holiday decoration destroy our environment?

The following quotations are samples which may stimulate creative responses on the part of students. Request that they interpret the full significance of the quotation.

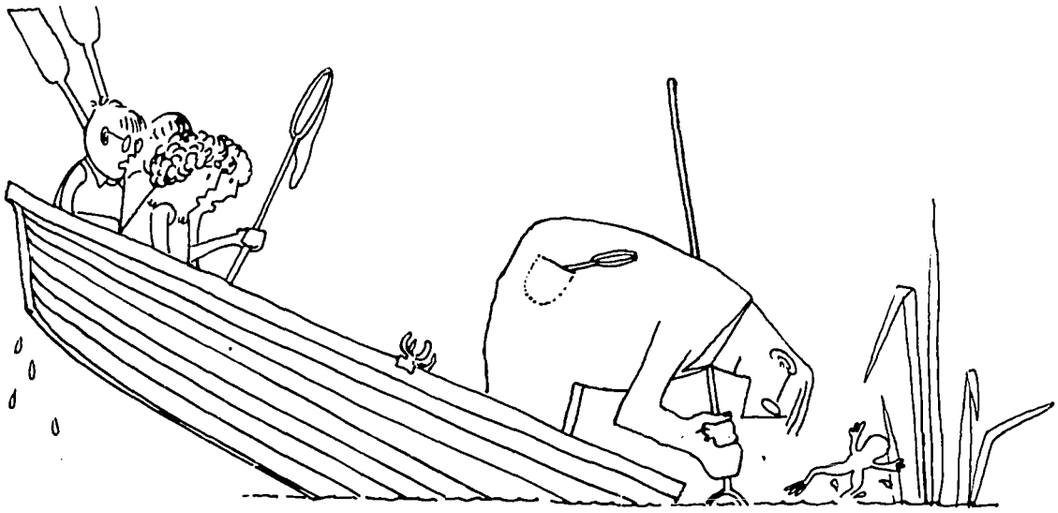
"Beyond the essential biological framework, the arts and social studies give human ecology its distinctive quality — its heart."

"One does not sell the earth upon which the people walk."

"Ecology is the science which warns people who won't listen about ways they won't follow of saving an environment they don't appreciate."

"If we assume any respect for the dignity of the individual, it is not enough to talk of mere survival."

Many other literary forms serve as effective vehicles for communicating environmental concern. Young children are delighted by the works of Dr. Seuss, and his poem, "The Lorax," is an excellent piece of social commentary. Rachel Carson's nonfiction is, of course, well-known, and a new biography, The House of Life: Rachel Carson at Work, by Paul Brooks should add a thoughtful footnote to her career as an environmentalist. Enterprising school librarians can perform an invaluable service to the classroom teacher in compiling references such as those above.



Student environment/ecology clubs

An increasingly common and effective means of capitalizing on student concern for the environment is the student environmental club. The following firsthand description of such a club speaks for itself in terms of purpose, motivation, organization, and effectiveness.

School clubs arise as a response to an expressed need. Such was the case with our club Survival, and it has continued to function because it meets the needs of a number of students by offering a variety of activities and by providing opportunities for many students to be leaders. The three basic elements of the club's philosophy are:

- inform ourselves
- inform others
- find something to do and do it

Three basic factors work to hold together this loosely-structured organization. First, each year all students interested in the activities of the club are invited to join the Survival homeroom. We wind up with about 12 juniors and 12 seniors at the beginning of each year. In a ranch-style school like ours, this arrangement keeps members in close touch.

Second, we never fail to hold our weekly meeting, and always plan a substitute program in the event our original plans fail to materialize. Although most of the work of the club is done by subcommittees or individuals at various times, everyone in the school who is interested in the environment knows that in room B-39, at 3:10 p.m., on Wednesday, there is a "happening."

Third, we have a committee of three who put out a weekly newsletter, written right after the Wednesday meeting, duplicated and addressed on Thursday, and distributed on Friday. About 90 students are on the distribution list — 90 students who know what the club is doing and appear when the club has an activity or project which appeals to them.

The club is open to any activity appropriate for an environmental group. When Andy walked in and said 'This club is no good. You aren't doing anything about local pollution,' we said, 'Okay, Andy, you are head of the local crud committee. Ask for volunteers and we'll give you all the help you want.' Within two months Andy's committee had shut down the school incinerator.

Survival has concentrated on three activities: political action, local environmental-pollution concerns, and environmental education.

Political action took the form of a year-long 'write-your-legislator' contest with a prize of $15.00 to the person who presented evidence (in the form of replies) that he had been writing to legislators.

Local environmental concern took several forms. Survival held spring and fall litter days to clean up the school grounds and the neighborhood. The school incinerator was shut down again. Microbuses of students went over to the Department of Environmental Conservation to help put out mailings. Paper drives were held to raise money.

Environmental education is manifest in a group called the Ambassadors. These students helped select educational material which was purchased with the money earned from the paper drives and from the sale of PYE (Protect Your Environment) buttons. They were the students chosen by the superintendent of schools to be environmental advisors at elementary schools desiring environmental enrichment.

Out-of-classroom experiences

The familiar quotation, "Four walls do not a prison make," is true in many contexts. Educationally, it can be disputed. If the four walls are those of the traditional classroom, students and teachers are, indeed, imprisoned. Current trends in education encourage breaking out of the four walls of a static classroom. The first step in planning to use the world outside as a classroom is to avoid the stereotyped interpretation that a "trip" is a 9 a.m. to 3 p.m. visit by bus to a major cultural institution. A trip should have considerably more latitude in destination, duration, and purpose.

The specific tactics employed in out-of-class experiences may be represented rather succinctly. Successful experiences will involve many of them.

- surveying
- interviewing
- observing
- experimenting
- collecting
- recording
- interpreting
- generalizing
- conceptualizing
- acting
- becoming sensitive, aware, and appreciative

The "world", which can serve as a classroom for students grades 5 through 12, might be thought of as a series of concentric circles, with the traditional schoolroom as a core.

School — The facilities and people of the school are resources for a variety of explorations. The school custodian can be interviewed about the physical plant (heating and electrical systems, plumbing, solid waste disposal) and can often be recruited to conduct tours around the school describing these systems and problems related to them. Other classes in the school can be used as sources of data. Surveys about consumption habits and attitudes, population diversity, or reactions to current environmental issues can be conducted. Reciprocally, other classes can serve as target populations for programs developed to wage "environmental campaigns."

School Site —The area around the school presents, to the initiated, a microcosm which can be tapped for an infinite variety of learnings. *Change* can be observed in rusting fences and cracked concrete, and in erosion of the building stones and the soil. Trees show cyclical changes and continuity. Plants growing in cracks in the sidewalk illustrate succession, and the weeds springing up around a telephone pole can lead to a study of *diversity*. Following a heavy rain, puddles, muddy streams, and gullies are miniature clues to the soil erosion, siltation, and flooding which periodically plague our world. Weather conditions,

direction and length of shadows, and positions of the moon all provide the experimental basis for understanding complex atmospheric and celestial relationships.

Man and his role in the environment are immediately apparent as soon as a class steps outside an urban school. Traffic, litter, noise, solid waste problems, smokestack emissions, and congestion impinge on all of his senses.

Neighborhood — Moving away from the school for a short walk presents opportunities for another series of explorations.

— What kind of neighborhood is it (residential, commercial, industrial)?
— Are there green, open areas?
— Are the buildings in good repair and are the streets clean?
— What are the sociological implications and explanations of the answers to these questions?
— Are there abandoned cars on the streets?
— If there is litter, what are the predominant items?
— Are litter baskets available?
— Are bodies of water nearby?
— If so, are they accessible or are they cut off by major roads?
— If they can be examined, what condition are they in?

Town, City, and County — The conventional trip via chartered bus or public transportation remains a very important form of out-of-the-classroom activity. The destinations and purposes of these trips can be highly diversified. Cultural institutions such as zoos, museums, botanical gardens, and aquariums often provide guided tours or self-guiding printed materials which quickly vitalize concepts laboriously learned from textbooks or classroom lessons. Some of these institutions also have facilities for students to participate actively in studying animals or working with plants.

Visits to forests, wetlands, lakes, ponds, and beaches can be used for ecological field studies, limited collecting, and inspiration. A limited number of factories and industries welcome school groups and provide them with guided tours. Similarly, it is often possible to arrange visits to municipal installations such as sewage disposal plants and water works.

Distant Points — Obviously, the more distant the concentric circle from the core, the more distant the destination, and consequently, the more complicated the trip. Included in this category would be five-day camping experiences or trips to Albany or Washington to observe and participate in the democratic process. Classes from rural and suburban areas might visit New York City to witness the multiplicity of environmental problems besetting a large urban area. Planning and raising funds for trips to distant points requires considerable effort, but the total experience provides extensive and lasting benefits.

There is variation in the duration of out-of-classroom experiences as well as in destinations. Just as the skirt length a woman selects should suit her genral configuration and personality, so the length of a trip should relate to the characteristics of the place visited and the objectives of the experience.

Mini-Experiences — Many activities in the school building, on the school site, and in the neighborhood can be handled adequately in short periods of time, often 10 or 15 minutes. If the purpose of the trip is to sensitize students to air pollution, a few minutes of viewing the smog on a day characterized by unacceptable air quality levels should suffice. Other mini-trip activities could include:

- measuring shadow length several times during the day
- taking air temperatures in different places at different times of the day
- recording observations of daily changes in the foliage of a tree in the springtime or in the fall.

In a large city, students might determine what percentage of the taxis on the streets are cruising looking for passengers, or what percentage of private cars carry only one passenger. This information could be used in a study of the automobile as an agent of air pollution and in a discussion of urban vehicular congestion.

Midi-Experiences — Most trips fall into this middle category. Walks in the vicinity of the school require between 45 minutes and an hour exclusive of preparation and followup. Included in these experiences might be transects in vacant lots, case studies of curb-side trees, litter surveys, and visits to supermarkets to examine wasteful packaging. Bus

trips to natural areas usually require a full school day. There should be leisure to explore fully, to enjoy nature, to react with the emotions as well as with the intellect, and to sketch or take photographs.

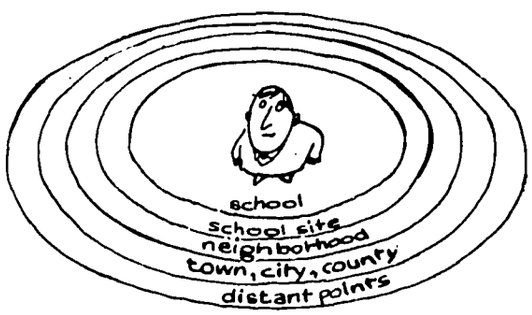
Maxi-Experiences — Trips which last for several days would be in this category. Few classes have such opportunities, but the possibility should be kept in mind when thinking of out-of-class experiences as a strategy.

Out-of-class activities expand the understandings developed within the classroom and school. They provide necessary and direct links between classroom-centered learning experiences and those dimensions of learning not confined to the classroom. This is a flexible strategy emphasizing use of the "field" experience in any form to nurture the environmental awareness of participants.

These experiences should:

- provide opportunities for deep, lasting learnings which cannot be duplicated in the classroom
- be well planned by teachers and students
- relate to classroom activities before and after the trip
- have specifically defined purposes
- provide time for questions and independent investigations

Students should be led to think of a trip as a normal classroom experience in a different setting. Unless specifically designed as such, a trip is not an outing or a day off from school. The time spent at the destination should be as long as is necessary to fulfill the trip's objectives. It is usually wise to terminate a trip before the point of diminishing returns is reached.



Student projects

Student projects offer the learner a special opportunity to initiate and direct personalized learning experiences centered on environmental issues. Active involvement in such projects contributes a new dimension to the student's awareness of environmental concerns. Not only does the student seek information and formulate ideas, but he also begins to appreciate the complex nature of environmental issues. This personal exposure and study fosters the internalization of attitudes and values essential to responsible behavior. Some specific suggestions for student projects are:

The Legislative Expert — A student is given the responsibility of keeping his class informed on environmental legislation. He skims incoming periodicals such as Environmental Action, New York State Environment, Not Man Apart, The Living Wilderness, and many more. From these he culls the latest state and national legislative information and produces ditto masters which become part of a weekly class newsletter or bulletin prepared for the student body.

Audio Adaptations for Filmstrips — A number of sound filmstrips have excellent pictures but the sound track is often appropriate only for older students. Several students may rewrite the words so that they are easily understood by primary school children. The new script is either read into a cassette with appropriate "beeps," or is recited as accompaniment to the filmstrip.

Interrelationship Charts — These are really pictorial term papers, involving much research but presented in chart or collage form. One favorite is "The Automobile." The basic idea is to portray how many ways our environment has been affected by the automobile. Interest, age, and maturity of the students determine the extent to which the effects are studied.

Comparative Advantage Studies — Select an area of environmental dispute. For example, which does more harm to the environment: the production, use, and disposal of waxed paper or that of cellophane? Such questions cannot be answered without a great deal more information than most people have. The student begins to understand the complexities of modern technological problems and the interrelatedness of seemingly separate things by collecting the information in a systematic, comparative manner. The method of presentation may take several forms; term paper, chart, collage, or photo essay.

Preparing Testimony for a Legislative Hearing — Environmental hearings receive wide publicity and occur in many parts of the State. A field trip to such a hearing gives students a chance to see what they are like. Students with special interests can research their topics so that when another hearing occurs they can present testimony which becomes part of the public record. Students should be encouraged to keep the presentation down to two or three pages, to limit it to one area of concern, to be specific, and to provide copies for distribution at the hearing.

Science Fiction — Much of today's science fiction deals with a world of the future which is a result of man's inability to control technology. Book reports, essays, and term papers can examine this hypothesizing in the works of Kurt Vonnegut, Jr., Ray Bradbury, Arthur C. Clarke, and Isaac Asimov and in movies such as 2001: A Space Odyssey or Dr. Hellstrom's Chronicle.

The Short Story or Scenario — Students often enjoy working on creative writing projects. One approach is . . ." suppose that it's true that . . . " This may be used with any number of projections. For example, "The 'greenhouse effect' melts the polar icecaps and raises the level of the oceans 300 feet at a rate of one foot a year." Suggest to students that they write a short story or one-act play describing themselves as central characters in events taking place in a littoral region of the United States which is currently 100 feet above sea level. The time interval of the writing might cover a period of 20 to 40 years. The objective is for the writer to construct an unfolding drama which describes the effects of the anticipated phenomenon upon the area at ten-year intervals.

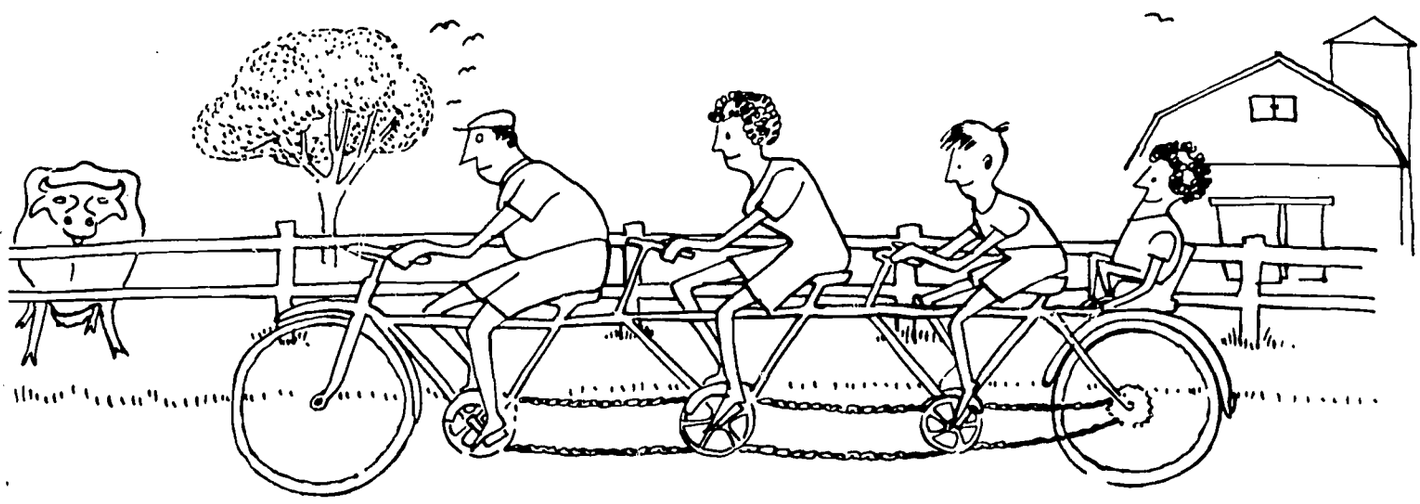
Family

Involving the family unit in improving the quality of the environment is unique in that this involvement can be as simple as finding a satisfactory way of disposing of the family pet's droppings, or as dramatic as family agreement on reducing noise and air pollution by substituting a non-motorized type of recreational activity for one such as motorboating or snowmobiling.

Continuing education can be instrumental in implementing a series of Envrionmental Issues Seminars which could generate a host of suggestions for family involvement in preserving the environment; suggestions which would facilitate the bridging of generation gaps. (See Continuing Education Seminars, a publication of the State Education Department).

Other suggestions for family participation follow.

- Community projects involving the recycling of paper, cans, and bottles could also involve the collective endeavors of an entire family.



participation activities

- Conscientiously policing recreational areas after having used them will provide the family with a feeling of having shown some responsibility to others who appreciate the same facilities.
- Perhaps a secondary school science teacher could explain how a compost pile is made, and the advantages of having such a source of rich earth. The advantages of involving young and old in maintaining this compost heap are self-evident. Using this compost to maintain a family vegetable garden would be an adjunct benefit.
- Population control has been cited as a critical factor in preserving the quality of the environment. Limiting the size of the family or considering the adoption of a child are most certainly decisions in which all members of the family should be involved.

While all such family activities are commendable in that they attack the problems as they presently exist, their greatest contribution, perhaps, is in the attitudes that they help to form. For, if parents show by word and precept a concern for the kind of world their children will be inheriting, then perhaps the next generation will be the last generation which needs to be convinced of the necessity of preserving the biosphere — the "life-circle" of which man is a part, and which man shares with other living and non-living things; the "life-circle" upon which man depends for his continued existence. It is his home, a living home, and man is not its possessor, but rather its possession.

Appendix

The concepts and generalizations featured in the earlier Department publications, Environmental Education Instructional Activities, K-6 and Environmental Education Instructional Activities, 7-12, are presented here for your reference use, inasmuch as the concept-centered activity strategy is one of those highlighted in this publication (p. 2).

Survival

- Survival of an organism depends upon its ability to adjust to its environment. Each kind of organism represents a collection of adaptations which fit it for survival under a given set of conditions.
- The basic function of any ecosystem is to capture and transfer energy.
- Diversity is a key factor in the survival of an ecosystem.
- Physical well-being is a fundamental necessity for survival even though man often places a higher value on other things.
- Man changes the natural environment to the extent that many species find it difficult to adapt to the new conditions.

Interdependence

- Living things are interdependent with one another and with their environment.
- Natural resources are unequally distributed with respect to land areas and political boundaries, and the use or misuse of them affects others.
- The energy requirements of man are met primarily by "food," and men are dependent upon other organisms through food chains and food webs.

Scarcity

- An understanding of scarcity is necessary to our understanding of the environment.
- Some parts of the natural environment are either difficult to replace, or are in fact irreplaceable.

Recycling

- In nature, there is a continuous recycling of many elements.
- Man would do well to observe nature's example and recycle the results of his technology.

Right vs. Responsibility

- Man has exercised a presumed right to exploit the environment with little regard for his responsibility to preserve it.
- It is the responsibility of each individual to become aware of existing governmental regulations intended to protect the environment.

Planning

- Decisions concerning the future must be based on long-term environmental benefits.
- Man alters the options available to future generations when he unwisely manipulates the natural environment.

Valuing

- Man currently faces the prospect of endangering his chances of a better life through the very measures he employs to achieve it.
- Individuals tend to select short-term economic gains, often at the expense of greater long-term environmental benefits.

Social Forces

- In order to preserve our threatened environment, present attitudes must change to reflect a widespread public concern which will encourage protective action by individuals, groups, and government.

Optimism

- Man has the ability to make this the best of all possible worlds.
- The arts seem to aid man in feeling a oneness with nature and with fellowmen.
- Opportunities have been provided for man to experience and enjoy nature.
- Although much needs to be done to improve and preserve our environment, we must stop occasionally and acknowledge the gains that are being made in these directions.

Acknowledgments

This publication has been produced under the direction of Barry W. Jamason, Chairman of the Department's Environmental Education Task Force. Appreciation is expressed to the following individuals for their contributions to the development of these instructional materials.

Herbert Bothamley, State Education Department;
Oscar A. Kaufman, Oaktree Films, New York;
Edward T. Lalor, State Education Department;
Gayle Lawrence, graduate student, State University of New York at Albany;
Eleanor McCollum, Schalmont Central Schools;
Hy Rosen, cartoonist, Albany Times Union;
Joan Rosner, School District 30, Queens;
George K. Tregaskis, State Education Department;
Sally Van Schaick, Linton High School, Schenectady;
Eugene Webster, Bethlehem Central Schools.

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